APPENDIX B

BRISTOL BABCOCK, INC. INFORMATION

Bristol Babcock Inc.

2035 Oak Lane
Harleysville, PA 19438
Telephone: (215) 234-0955
Fax: (215)234-0956

FAX COVER

Date: March 2, 1998

TO: Steve Lowry

FAX: 717-737-2442

Company: S. G. Lowry Associates, Inc.

FROM: L. W. Jope - Bristol Babcock, Inc.

SUBJECT: Your Trucking Company Weights Measure Application.

Total Number of Pages: One page plus cover.

Steve,

Enclosed with this cover is your quotation for the above. Items 1 and 2 go at the Data Central as well as the software, items 5, 6, 7 and 8. Items 3 and 4 go at the remote weighing location.

My quotation does not include a computer but you might be able to get away with a Keypad / Display for about $400.00 additional.

I hope this will suffice. Please call if you have questions.

Regards,

Lyn Jope

QUOTATION

Customer Name:
S. G. Lowry & Associates, Inc.
438 Sioux Drive
Mechanicsburg, Pa. 17055

Attn: Steve Lowry FAX: 717-737-2442

Bristol Babcock Inc.
2035 Oak Lane
Harleysville, Pa. 19438
PH:(215)234-0955 FAX:(215)234-0958
Quote No. LWJ030298NE-2

This quotation is being provided in regard to following Bristol Babcock equipment:

Item	Qty.	Product Code	Description	Price	U/M	Code	Extension
1	1	840	#396048-52-8, RTU 3305 for Data Central.	$1,235.00	ea	0	$ 1,235.00
2	1	840	#SAP-042-110, Nema 4 Enclosure with P. S., Dial Line Modem and Surge Protection.	$1,060.00	ea	0	$ 1,060.00
3	1	871	#3301-10A-125-1R, RTU 3301 with AI Input.	$340.00	ea	0	$ 340.00
4	1	873	Nema 4 Enclosure with P. S. and Dial Line Modem.	$1,429.00	ea	0	$ 1,429.00
6	1	898	#396241-01-4, ACCOL Software	$1,495.00	ea	0	$ 1,495.00
6	1	898	#395509-21-1, Open BSI Utilities for Windows 95 / NT	$995.00	ea	0	$ 995.00
7	1	898	#395509-24-6, Open BSI Data Collector for Windows 95 / NT	$495.00	ea	0	$ 495.00
8	1	898	#392716-01-1, ZdMMI Graphics Software	$995.00	ea	0	$ 995.00
							$ 8,044.00

Range:	Cal:	Scale:	Chart:		Drive Speed:			Mount:	Connections:
			In. Volt.	Freq.	Elect/Spri	Volts	Freq	Color	Air Elec. Elem.

SPECIAL NOTES:

F.O.B.: Watertown, Conn.
Terms: Net 30 Days
Delivery: 6 to 8 Weeks ARO

L. W. Jope
Salesperson

3/2/98
Date

Phone: 215-234-0955

SPECIFICATION SUMMARY

D460 SS-1a

RTU 3301
REMOTE TERMINAL UNIT

The RTU 3301 family of remote terminal units provides cost-effective gathering of remote low point count I/O. The RTU 3301 communicates with other Bristol Babcock Network 3000 process controllers via RS 485, modem, and radio interfaces. It has been designed to apply to a wide range of uses:

- o Ideal for remote well monitoring applications requiring an analog and discrete input;
- o Lift station monitoring;
- o Remote pressure, temperature or flow measurement;
- o Remote contact status and control;
- o Remote set point or valve control.

Offered in a rugged field-mount housing, the complete RTU 3301 family includes models that accept input from sensors (T/C and RTD), linear and non-linear analog transmitters (current, voltage and frequency) and discrete devices (Contact Closure and logic). They convert the input to a noise-free RS 232C or RS 485 format perfect for long-distance transmission over a communication link and direct input into a DPC 3330 or DPC 3335 process controller.

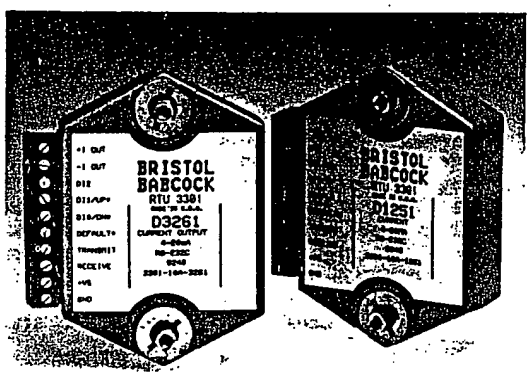
Cost-Effective Multidrop Data Acquisition

Up to 32 RTU 3301s of any type can be connected on the same communication link and input into a single DPC 3330/DPC 3335 serial port. Each module has a unique address and can be remotely accessed over the communication link to perform functions completely independent of the others.

Since only a single link is needed to collect data from up to 32 scattered field locations, the cost of running dedicated wires is eliminated.

Eight and fourteen module backplanes are available for convenient mounting of multiple RTUs in one area.

The RTU 3301 also incorporates inherent alarm and interlock capabilities which further reduce the need for additional devices.



FEATURES

- o Compact size
- o Low power consumption
- o 15 bit A/D converter; 8 conversions per second
- o -25° C to +70° C temperature range
- o RS 485 communication to 38.4 K baud
- o Serial ASCII communication with CHECKSUM
- o Compatible with DPC 3330 and DPC 3335
- o Directly compatible with Genesis operator interface through serial port

RTU 3301
REMOTE TERMINAL UNIT

SPECIFICATION SUMMARY D460 SS-1a

OPERATION OF INPUT MODULES

Each RTU 3301 module performs as a complete and self-contained single-channel interface system providing analog signal conditioning circuits optimized for a specific input type. Low level signals are amplified and then converted to digital data eight times per second by a microprocessor-controlled 15 bit integrating analog-to-digital (A/D) converter. The microprocessor continually converts any zero or span offsets, provides automatic signal filtering and converts the data to serial data for transmission to the host upon request. Each module (up to 32 per communication link) has a unique address and operates completely independent of others on the link.

Discrete Inputs/Outputs

All RTU 3301 models accept discrete inputs. Some types also provide discrete outputs (see Table 2 below). Discrete input lines accept TTL, CMOS or Contact Closure inputs. One of the discrete inputs on a module may be used as either an event counter or simply to sense switch closures or the state of remote discrete signals. Discrete outputs are open collector transistor switches that can be used to present information from or to the field or they can be activated by the internal alarms described below. The outputs are designed to activate solid state relays for alarm and other control interlock functions.

Event Counter

Each RTU 3301 contains an internal event counter, the input of which is one of the module's discrete inputs. The event counter may be used to keep a record count of any low speed event. Up to 10 million repetitions or pulses (up to 60 Hz maximum) can be stored, read and then cleared by the host DPC 3330/DPC 3335.

HI/LO Alarms

The internal alarms of the RTU consist of two alarm registers that are used to store operator-specified high and low alarm limit values. Internal alarms may be used to activate discrete outputs on the modules (current, voltage and T/C models only) to turn on alarms or to perform simple alarm/control functions.

Digital Filter

The module microprocessor automatically selects the proper filter after each A/D conversion (eight times per second). Separate time constants are configured by the user for small and large signal changes to smooth the analog data in noisy environments.

Programmable Function Option

The -PRG option may be specified for current, voltage and frequency input models to linearize any of a variety of non-linear functions including square root, nth root, nth power and high order polynomials (RTD and T/C input models automatically linearize the output without the -PRG option). A straight-line segment approximation technique is used with up to 24 segments. It also provides scaling for communication of values in engineering units. The -PRG option is also available for the analog output module to provide programmable slope rate, scaling, startup and readback values.

*Table 1a. Inputs**

Voltage	Current	Thermocouple[1]	RTD[1]	Frequency	Discrete
100 MV -100 to 100 mV 1V -1 to 1 Vdc 5V -5 to 5 Vdc 10V -10 to 10 Vdc 100V -100 to 100 Vdc	4-20 MA into 4 ohms 1 MA - 1 to 1 mA into 100 ohms 10MA -10 to 10 mA into 10 ohms 100MA - 100 to 100 mA into 1 ohm 1A -1 to 1 A into 0.1 ohm	Specify thermocouple type: J, K, T, E, R, S, B and C (spans less than 5 mV acceptable; please note accuracy specification)	PT Accepts any 2-, 3- or 4-wire 100 ohm platinum RTD; Alpha= .00385 ohm/ohm ° C (spans less than 5 ohms acceptable; note accuracy specification)	1 HZ-20 KHz Accepts frequency inputs from 1 Hz to to 20 KHz	D Discrete inputs and outputs (15 I/O channels per unit can be configured as either inputs or outputs) or 7 discrete inputs 8 discrete outputs (Fixed)

[1] Thermocouple and RTD inputs are not available with the -PRG option.

*From listed ranges, any range, span or elevated zero may be used (i.e., 10-60 mV, 20-40 mA, 0-250 Hz, etc.).

Table 1b. Outputs

Voltage:	0-1 V -1 to 1 Vdc 0-5 V -5 to 5 Vdc 0-10 V -10 to 10 Vdc
Current:	4-20 mA (adjustable to 0-20 mA)

SPECIFICATION SUMMARY

D460 SS-1a

SPECIFICATIONS

Performance

- Power: 11-30 VDC, 1.00 watt max., 1.3 watt current output
- Adjustments: Set-up information and calibration constants are entered via personal computer and are stored in non-volatile EEPROM in each module; auto zero and auto calibration eliminate the need for adjustment potentiometers
- Ambient temperature ranges:
  - Storage: -25° C to +85° C (-15° F to +185° F)
  - Operating: -25° C to +70° C (-13° F to +158° F)
- Weight: 6 oz. (170 grams)

Current/Voltage Analog Output Model

- Output resolution: 12-bit
- Accuracy: ±0.1% of full scale (all sources)
- Zero drift: +30µV/ °C, ±1 µA/ °C (17 µV/ °F, 0.11 µA/ °F)
- 1,000 conversions per second
- Current: 4-20 mA (adjustable to 0-20 mA)
- Ambient temperature effect: ±0.005% of span/ °C (±0.0014%/°F) maximum
- Output protection
  - Current: 240 V
  - Voltage: ±30 V
- Load capability
  - Current: 600 ohms
  - Voltage: 5 mA minimum, 10 mA maximum
- Setting time: 300 microseconds to ±0.1% full scale typical
- Ramp rate: Fixed at 5 seconds from 0 to full scale (auto or manual), adjustable with programmable option from .01 mA or volts per second to 10,000 mA or volts per second

Voltage/Current Inputs

- Resolution: 0.01% of F.S. scale (4 digits)
- Accuracy: ±0.02% of F.S.
- Zero drift: ±1 count maximum (auto zero)
- Ambient temperature effect
  - For voltage inputs, ±0.005% of span/ °C, maximum
  - For current inputs, ±0.008% of span/ °C, maximum
- Common mode rejection: 100 dB at 50/60 Hz
- Input protection (voltage inputs only): Up to 250 Vax
- Input impedance
  - Voltage inputs of -1 V to +1 V or smaller: 10 megohms
  - Voltage inputs -5 V to +5 V or greater: 1 megohm
- Voltage drop (current inputs only): ±0.1 V max.
- 8 conversions per second
- Isolation: Up to 500 Vrms input-to-output and input-to-power supply isolation
- Internal alarms: Open collector to 30 V; 30 mA maximum

Discrete Inputs and Outputs

- Discrete inputs: Internal pull up resistors for direct switch input on analog modules
- Voltage levels (discrete inputs): ±30 V without damage
- Switching levels (discrete inputs)
  - > High: +3.5 V minimum
  - < Low: +1.0 V maximum
- Discrete outputs: Open collector to 30 V, 30 mA maximum on analog modules; 100 mA maximum on discrete I/O modules
- Event counter: Up to 10 million positive transitions @ 60 Hz maximum, filtered for switch debounce

Thermocouple Input Models

- Resolution: ±1° C or ° F
- Overall accuracy (error from all sources): At 0°-40° C ambient, ±1.0° C maximum for T/C types J, K, T, and E; ±2.5° C maximum for T/C types R, S, B and C
- Input impedance: 100 megohms minimum
- Lead resistance effect: <20 µV per 350 ohms
- Input burnout protection: Up to 250 Vac
- Linearization: ±1° C overall accuracy (error from all sources)

RTD Input Models

- Resolution: ±0.1° C or °F
- Accuracy: ± 0.3° C
- Input connections: 2-, 3-, or 4-wires
- Excitation current: 0.25 mA
- Sensor: 100 ohm platinum
- Lead resistance effect
  - 3-wire: 2.5° C per ohm of unbalance
  - 4-wire: negligible
- Maximum lead resistance: 50 ohms
- Input protection: Up to 120 Vac
- Linearization: ±0.3° C overall accuracy (error from all sources at 25° C ambient)
- Ambient temperature effect: ±.0025%/ °C max.

Frequency Input Models

- Resolution: 0.01 Hz
- Accuracy: ±0.1% of reading, ±0.1 Hz
- Ambient temperature effect: ±0.002% of span/ °C
- Input impedance: 100 kilohms
- Switching level: Selectable OV, +2.5 V
- Hysteresis: Adjustable from ±10 mV to ±0.5 V (up to 1.0 V for units with -PRG option)
- Input protection: 250 Vac

SPECIFICATION SUMMARY

D460 SS-1a

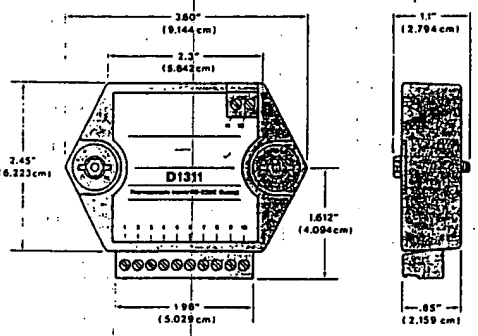
COMMUNICATION

- RS 232C or RS 485 (not user-selectable; pre-set at the factory): 2 wire
- Up to 32 multidrop nodes per host communication port (RS-485 only)
- Selectable baud rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400
- ASCII format command/response protocol with CHECKSUM
- Parity: odd, even or none
- All communication setups (address, baud rate, parity) stored in nonvolatile memory using EEPROM
- Communication PROM available for DPC 3330 and DPC 3335
- Communication distance: Up to 10,000 feet RS 485

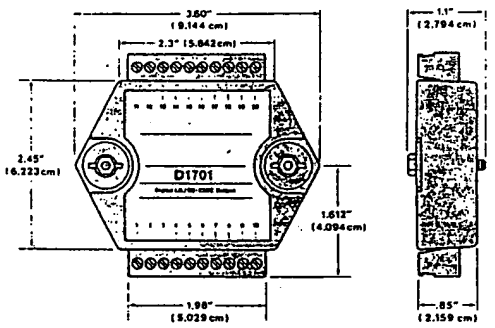
PROTOCOL

The RTU 3301 uses a serial ASCII communication protocol for interfacing to the DPC 3330/DPC 3335 / RTU 3310 process controllers. Serial ASCII, being a common and easy to implement protocol, allows the RTU 3301 to interface with many other host devices that also support ASCII. In addition, Genesis supports directly connected RTU 3301s as well as DPC 3330, RTU 3310 and DPC 3335 process controllers.

For message security, the RTU 3301 protocol employs a CHECKSUM error detection method to ensure communication reliability of both transmitted and received messages.



Analog I/O Module



Discrete I/O Module

NOTE: Spacing for mounting screws = 2.700" (6.858 cm). Screw threads are 6 x 32.

Figure 4. Mounting dimensions

Bristol Babcock

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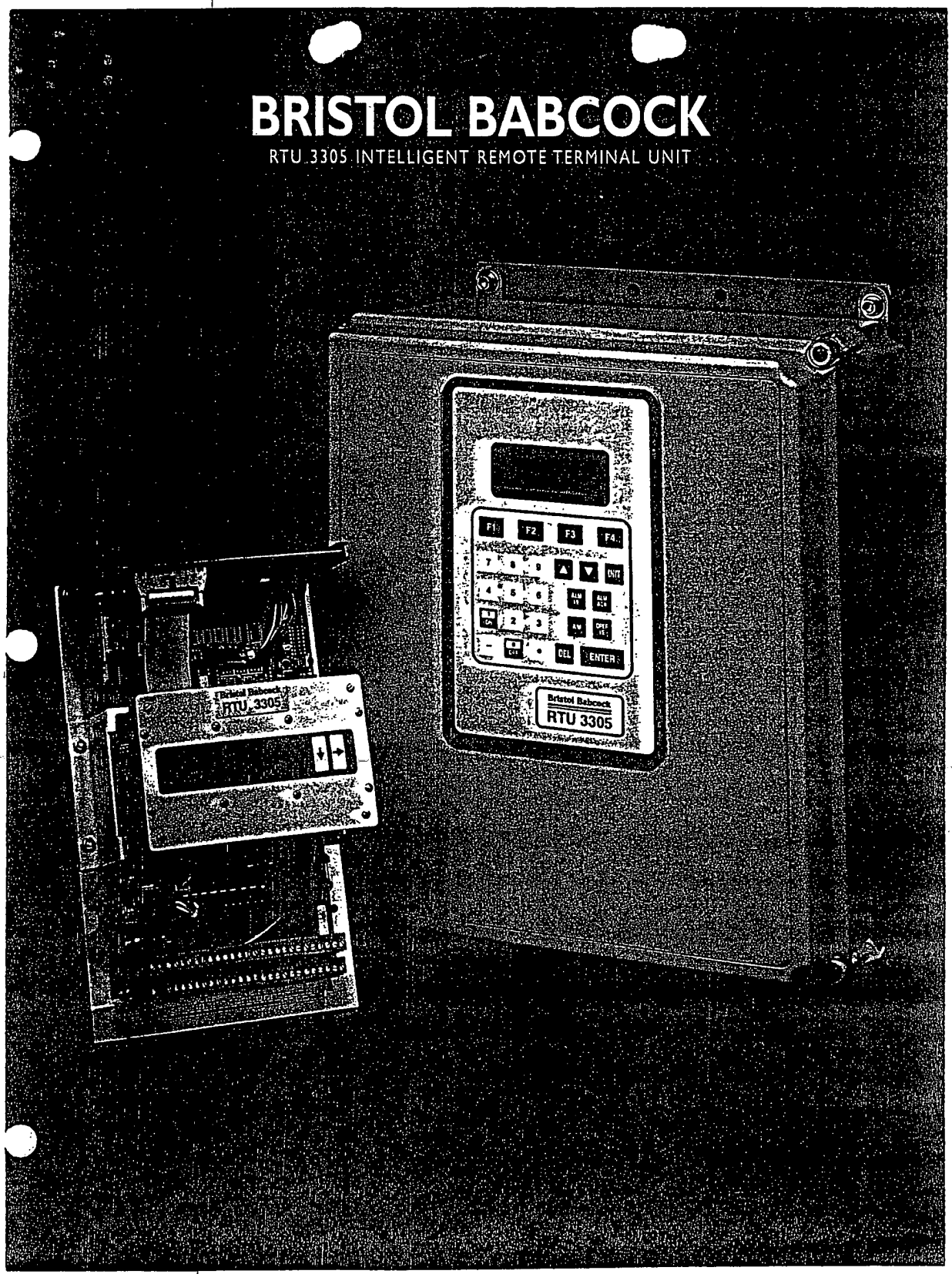
BRISTOL BABCOCK

RTU 3305 INTELLIGENT REMOTE TERMINAL UNIT



NETWORK 3000
MODEL RTU 3305
INTELLIGENT REMOTE TERMINAL UNIT

SPECIFICATION SUMMARY D465 SS-0

PROCESS I/O

- 4 Analog Inputs (optional)
- 2 Analog outputs (optional)
- 8 Discrete Inputs (interruptable for low speed counters)
- 2 Discrete outputs
- 6 Selectable discrete I/O
- 1 High Speed Counter Input

COMMUNICATION PORTS

The RTU 3305 includes four asynchronous serial ports:

- Local network port (RS232/RS485) - 9 pin D connector
- Local interface port (RS232) - 9 pin D connector
- Option port (RS232/optional comm card) - 9 pin D connector
- Configuration port (3 pin RS232)

OPTION PORT CAPABILITY

- RS485 Adapter
- 1200 baud private leased line modem
- 9600 baud switched network dial-line modem
- RDI (Radio Delay Interface)
- TIB (Transmitter Interface Board)
- External fiber optic modem
- Baud Rates: 300, 1200, 2400, 4800, 9600, 19200, 38400

CONFIGURATION PORT CAPABILITIES

- RS232 3 pin port
- Flashware download
- Asynchronous BSAP communication

COMMUNICATION PROTOCOLS

BSAP

- Bristol Standard Asynchronous Protocol
- ISO Standard 1745/2111/2629
- Compatible with all Bristol Network 3000 Products
- Global addressing: 1-32767 Nodes
- Hierarchy : 5 levels
- Contention Scheme: Polled

Refer to specification summary D454SS-6a

MODBUS

- Standard Modicon Modbus
- ASCII and Binary Versions
- Master or Slave configuration

ASCII

- Simple ASCII, with selectable start, stop, parity, and word format
- Used for communication with RTU 3301's and peripheral devices such as computers, printers, graphic terminals, displays, and handheld terminals
- Bidirectional communication
- Programming: Standard ACCOL Logger module uses a complete set of format commands for message configuration, handshaking, display formatting, and printed report formatting

OTHER PROTOCOLS

- Allen Bradley PLC-2, standard
- Adept protocol, optional
- Columbia Natural Gas (ANSI 3.28), optional
- El Paso Natural Gas, standard
- Teledyne-Geotech, standard
- Protocols are selectable on a per-port basis; RTU 3305 can use multiple protocols (on different ports) simultaneously
- Several others also available

ENVIRONMENTAL SUITABILITY

- Operating temperature -40 deg. C to 70 deg. C, Relative humidity: 5 to 95%, noncondensing
- RFI susceptibility: Per SAMA standard PMC 33.1-1978, using field of 10 V/Meter from 20 Mhz to 500 Mhz
- Vibration: 10-150 Hz: 1 G constant acceleration
- Instrument certification: (Pending) Class I, Division 2, Groups A, B, C, & D hazardous locations
- Power input: 12 or 24 V DC Nominal, (9 to 30.0 V DC)
- Power requirements: 3.5 watts, additional 0.5 watts for modem option
- Loop Power: 12 V/24 V
  - DI per loop .06/.12 W
  - AI per loop .56/.48 W
  - AO per loop .56/.48 W

PROCESS I/O

TERMINATIONS

- Pluggable terminations
- Screw compression terminals
- Accepts up to 12 AWG wire

ANALOG INPUTS

- 4 different inputs
- 1-5 V DC/ 4-20 ma DC, configurable

NETWORK 3000
MODEL RTU 3305
INTELLIGENT REMOTE TERMINAL UNIT

SPECIFICATION SUMMARY D465 SS-0

- Internal 24 V for 24 V version and 21 V for 12 V version source for transmitters
- 12 bit A/D
- Conversion time: 200 micro sec
- Accuracy: 4-20 ma
  0.1% at 25 deg. C
  0.2% over -20 to 70 deg. C
  0.3% over -40 to 70 deg. C
- Input filtering: single pole 50 msec time constant; 300 msec to 0.1% of input value
- Settling time: 18 micro sec to 0.01%
- Common mode protection: 180 VDC
- Surge protection: Meets C37.90-1983
- Shields may be tied to power common

ANALOG OUTPUTS (optional)

- 2 outputs
- 4-20 ma DC
- 12 bit A/D
- Accuracy:
  0.1% at 25 deg. C
  0.2% over -20 to 70 deg. C
  0.3% over -40 to 70 deg.C
- Surge protection: Meets C37.90-1983

DISCRETE INPUTS

- Internally sourced dry contacts from input power (12 V or 24 VDC)
- Current draw - 5 mA per input
- Isolation: optical isolation; 1500 V common mode isolation
- Counter Inputs: interrupt-driven; maximum 300 Hz on a single input, 800 Hz total pulses on eight inputs; accumulator or frequency mode selectable in ACCOL software
- PDM input ranges:
  Bristol 5 second (1 to 4 sec);
  Bristol 15 second (3 to 12 sec);
  BIF 15 second (0 to 13.33 sec);
  BIF 60 second (0 to 53.3 sec)
- PDM input variables scaled in ACCOL software

DISCRETE OUTPUTS

- Open collector output
- 100 ma @35 V DC
- Output modes: Programmable via ACCOL
  On/off latch;
  Momentary*;
  Counter/pulse*;
  PDM;
  PDO: (Raise/lower pulse duration) with resolutions selectable: 20 ms, 50 ms, 100 ms

*durations and frequencies depend on ACCOL task interval (0.02 to 5400 sec)

HIGH SPEED COUNTER INPUT

- Internally sourced dry contacts/ open collector from input power: 5 mA current draw
- Frequency Range: 0-10 KHz
- Debounce circuitry
- Isolation: optical isolation; 1500 V common mode

ACCESSORIES

LAP TOP COMPUTER

- IBM-compatible with min. 640 K RAM
- Hard disk drive and floppy disk drive required
- MS/DOS operating system required
- RTU 3305 cable required:
  9 pin D connector cable 390486-03-5
  3 pin configuration port cable 395414-02-4

DISPLAY (optional)

Option 1:
- 2 line x 16 character alphamumeric liquid crystal display (LCD).
- Two button keypad
- Local internal mount
- Operating Range: -20 deg. C to 70 deg. C

Option 2:
- Same as option one but remote configuration for mounting on enclosure door or panel
- RS485 remote operation up to 50 feet
- Operating range: -20 deg. C to 70 deg. C

Option 3:
- Keypad/display
- 4 line x 20 character alphanumeric liquid crystal display (LCD)
- 5 x 7 dot matrix
- Membrane type with tactile feedback
- 25 keys in a 5 x 5 matrix
- 2.6 x 2.6 inch key size
- Remote configuration for mounting on enclosure door or panel
- RS485 remote operation up to 50 feet
- Operating range: -20 deg. C to 70 deg. C

Refer to specification summary D456SS-3a

POWER SUPPLIES

- Two models:
  12 VDC @ 1.8 A
  24 VDC @ 0.9 A
- Fixed IC Regulated Output
- Uninterruptable version with backup battery:
  12 volts @ 7.2 A-Hrs (8 hrs. min. backup)
  24 volts @ 7.2 A-Hrs (16 hrs. min. backup)

NETWORK 3000
MODEL RTU 3305
INTELLIGENT REMOTE TERMINAL UNIT

SPECIFICATION SUMMARY D465 SS-0

MODEMS

- Optional external or built-in modem connects to port C (option port)
- Two types of modems available:
  - 1200 baud private line modem
  - 9600 baud switched network modem for auto-dial/ auto-answer applications

TRANSMITTER INTERFACE BOARD (TIB)

- Optional, integral, plug-in board connects to port C (option port)
- Allows up to five 3508 smart transmitters to function as slaves to the RTU 3305 (24 V only)
- Communicates at 1200 baud
- Polling speed: one transmitter per second
- Provides 24 volt loop power required by 3508

Refer to specification summary D461SS-6

RADIO DELAY INTERFACE BOARD (RDI)

- Radio and satellite communication delay board
- Optional, integral, plug-in board connects to port C
- Provides RS232 interface to an external radio modem or transceiver without RTS/CTS control
- Three timing functions available:
  - Leading Edge Delay (RTS-to-CTS Delay)
  - Trailing Edge Delay
  - Carrier Time Out

Refer to specification summary D461SS-5

RS-485 Interface Board

- Optional, integral board connects to port C (option port)
- Allows local master/slave networking to other Bristol Babcock 33xx controllers, RTUs and transmitters, or devices with RS-485 capability
- Provides surge protection to the equipment from transient voltages on the communication lines
- Jumper selectable line termination and biasing for end nodes

Refer to specification summary D456 SS-2a

Minimum Requirements

- ACCOL Tools version 5.13 or later or ACCOL Workbench version 5.13 or later. ACCOL Tools requires MS Dos. ACCOL Workbench requires Windows 95 or Windows NT.
- Flash cable 395414-02-4 for port and address configuration.

Bristol Babcock

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